Longspined Sea Urchin Harvesting

John Keane
1. Harvesting

Is harvesting an effective control mechanism
- How much (tonnage)
- Where from (spatial)
- Overlap with other fisheries
- Impacts on the population

2. Processing

Increasing profitability, decreasing subsidy
- Roe itself
- By products
- Waste products
1. Harvesting – How much

<table>
<thead>
<tr>
<th>Season</th>
<th>Catch (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/09</td>
<td>7</td>
</tr>
<tr>
<td>2009/10</td>
<td>12</td>
</tr>
<tr>
<td>2010/11</td>
<td>64</td>
</tr>
<tr>
<td>2011/12</td>
<td>61</td>
</tr>
<tr>
<td>2012/13</td>
<td>81</td>
</tr>
<tr>
<td>2013/14</td>
<td>97</td>
</tr>
<tr>
<td>2014/15</td>
<td>19</td>
</tr>
<tr>
<td>2015/16</td>
<td>40</td>
</tr>
<tr>
<td>2016/17</td>
<td>42</td>
</tr>
<tr>
<td>2017/18</td>
<td>188</td>
</tr>
</tbody>
</table>

Tasmania: 608 tonnes
>1 million urchins
1. Harvesting – Where From – Large Scale

> 90 % from St Helens Region

Discussion Point: Optimising the spatial distribution of catch if harvesting is a management tool
Voluntary GPS tracking of fishing effort 2014-15

~ 50-70% GPS coverage of urchin harvest

**Voluntary** GPS tracking of fishing effort 2014-15

~ 50-70% GPS coverage of urchin harvest

Limited data but…

~ 50% of urchin fishing activity overlapped spatially with abalone fishing activity

Further fine scale spatial data

- Better define the interaction between fisheries spatially
- Determine *the effectiveness of harvesting as a control measure* through fleet dynamics and serial depletion.

Spatial

Depth

Figure 1. Spatial overlap between urchin fishing (points) and abalone fishing (polygons) at Sloop Rock, NE Tasmania.

Figure 1. Fishing by Year, depth and abalone reporting block for urchin and abalone harvesting in Tasmania.
1. Harvesting – Impacts on Population – St Helens

Size and age structure

Increasing fishing pressure

Absolute abundance higher at Sloop
95 tonnes harvested to 2016

Emergence of small urchins following harvest?

2018- 42 tonnes off Sloop Reef

Resurvey of sites would be highly informative
2. Processing

Seasonally adjusted industry recovery

**Roe: 9%**
- A Grade
- B Grade: 6%
- C Grade
- D Grade: 3%

2018 recovery estimates
- 10.5 tonnes A-C Grade
- 5.8 tonnes D Grade (unsaleable)
- 133 tonnes waste (dumped at $200/t)

Urchin components by weight

- Test: 57%
- Coelomic fluid: 18%
- Gonads: 11%
- Guts: 10%
- Jaws: 4%
2. Processing – Optimising Roe Quality

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>A Grade</td>
<td>9%</td>
</tr>
<tr>
<td>B Grade</td>
<td>6%</td>
</tr>
<tr>
<td>C Grade</td>
<td>6%</td>
</tr>
<tr>
<td>D Grade</td>
<td>3%</td>
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</tbody>
</table>

Opportunity >> R&D

5.8 tonnes D Grade (unsaleable)

Seasonal, habitat, post harvest > Increase A-C Grade
Phd Student Paolo Campus

Opportunity >> R&D

Sauce
Pâté
Oils
2. Processing – Waste

*FRDC 2016-208 - Waste to Profit*

*Phd Student: Paolo Campus*

- **Macronutrients**
  - Calcium (40.4%)
  - Magnesium (1.78%)
  - Nitrogen (0.5%)
  - Potassium (0.26%)
  - Phosphorus (0.032%)

- **Micronutrients**
  - Boron (38.1ppm)
  - Iron with (19.3ppm)
  - Zinc with (6.36ppm)

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**Growth at the higher concentration treatments matched the Hoaglands control (ideal)**

Next step: larger scale commercial trials: ARC Linkage??
Alternate Uses

Aquaculture – roe enhancement

Urchins as Bait

Bioactive molecules
Pharmaceuticals / Nutraceuticals (CSIRO)
Harvesting: Conclusions and Needs

1. Harvesting: an effective control mechanism
   - **Consider:** Optimising the spatial distribution of catch (optimisation)
   - **Need:** additional data to
     - show effectiveness of harvesting (and subsidy)
     - Harvest rates vs recruitment
     - Fine-scale catch and effort – fleet dynamics, serial depletion
     - Overlap between urchin and other fisheries (abalone)

2. Increasing profitability, decreasing subsidy
   - **Opportunities:**
     - Optimising roe quality - underway
     - By-product development – 36% D grade – Needs R&D (5.8 t)
     - Export market development (national level)
     - Waste products – Fertiliser – Needs upscaling to a commercial trial (62 t)

Around the world urchin fisheries have collapsed due to overfishing
Costal mapping/modelling
- Local ecological knowledge (LEK)
- Towed video
- Exposure
- Environmental variables